AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions and listings of the claims in this application.

Please amend the claims as follows:

1-21. (Canceled)

22. (Currently amended) An imaging method, comprising:
simultaneously determining in vivo distributions of bioluminescent and/or fluorescent markers and radioactive markers at identical projection angles, wherein the distribution of the bioluminescent and/or fluorescent markers is determined by separate detection of photons having a first average energy, which are emitted by the bioluminescent and/or fluorescent markers, by at least one first detector and wherein the distribution of the radioactive markers is determined by simultaneous separate detection of photons having a second average energy, which are emitted by the radioactive markers, by at least one second detector, wherein the at least one first detector and the at least one second detector are fixedly arranged in a specific spatial arrangement relative to each other; and wherein the at least one first detector and the at least one second detector are fixedly arranged as a rigid arrangement; and
reconstructing an image of the distribution of the markers following the determining.

23. (Currently amended) The imaging method as claimed in claim 22, wherein in the step of determining in vivo distributions, the photons of the bioluminescent and/or fluorescent markers having the first average energy and the photons of the radioactive markers having the second average energy are separated for the separate detection with the aid of a layer, the layer essentially reflecting [[or]] the photons of the bioluminescent and/or fluorescent markers and transmitting the photons of the radioactive markers ~~in a manner dependent on their energy~~.

24. (Previously presented) The imaging method as claimed in claim 23, wherein in the step of determining in vivo distributions, the layer serves for reflecting the photons of the bioluminescent and/or fluorescent markers in the direction of the at least one first detector and for transmitting the photons of the radioactive markers in the direction of the at least one second detector.

25. (Previously presented) The imaging method as claimed in claim 22, wherein in the step of determining in vivo distributions, the bioluminescent and/or fluorescent markers comprise at least one marker from the group consisting of the markers of luciferase reporters, the marker molecules having emission wavelengths in the near infrared range (NIRF molecules) and the molecules of GFP (green fluorescent protein).

26. (Previously presented) The imaging method as claimed in claim 22, wherein in the step of determining in vivo distributions, the radioactive markers comprise at least one marker from the group As-72, Br-75, Co-55, Cu-61, Cu-67, Ga-67, Gd-153, I-123, I-125, I-131, In-111, Ru-97, Tl-201, Tc-99m and Xe-133.

27. (Previously presented) The imaging method as claimed in claim 22, wherein the detection of the photons having the first average energy is carried out by at least one CCD camera providing the first detector and the detection of the photons having the second average energy is carried out by at least one single photon emission computer tomography (SPECT) detector providing the second detector comprising a collimator with at least one aperture.

28. (Currently amended) An imaging method, comprising:
alternately determining in vivo distributions of bioluminescent and/or fluorescent markers and in vivo distributions of radioactive markers with a common measurement apparatus at identical projection angles, wherein the distribution of the bioluminescent and/or fluorescent markers is determined by separate detection of photons having a first average energy, which are emitted by the bioluminescent and/or fluorescent markers, by at least one first detector and, alternately with respect thereto, the distribution of the radioactive markers is determined by separate detection of

photons having a second average energy, which are emitted by the radioactive markers, by at least one second detector, wherein the at least one first detector and the at least one second detector are fixedly arranged in a specific spatial arrangement relative to each other; and wherein the at least one first detector and the at least one second detector are fixedly arranged as a rigid arrangement; and
reconstructing an image of the distribution of the markers following the determining.

29. (Currently amended) An apparatus for ~~carrying out the~~ in vivo imaging ~~method of claim 22, the apparatus~~ comprising:
at least one CCD camera as ~~the~~ a first detector,
at least one single photon emission computer tomography (SPECT) detector as a ~~the~~ second detector and
a layer, which essentially reflects the photons of the bioluminescent and/or fluorescent markers to the CCD camera and essentially transmits the photons of the radioactive markers to the SPECT detector.

30. (Previously presented) The apparatus as claimed in claim 29, wherein the at least one SPECT detector comprises a scintillation crystal array with a multiplicity of scintillation crystals and a spatially resolving photomultiplier array.

31. (Previously presented) The apparatus as claimed in claim 29, wherein the at least one CCD camera comprises two cooled CCD cameras facing one another,
the at least one SPECT detector comprises a SPECT detector arranged perpendicular to the CCD cameras, and
wherein the apparatus further comprises:
a shielding arranged in front of the SPECT detector and bent at an angle of 90°, and a layer fixed on the shielding and likewise bent at an angle of 90°, the bending edge of said layer lying on the bending edge of the shielding, the layer covering an aperture in the shielding and largely reflecting the photons emitted by the bioluminescent and/or fluorescent markers and largely transmitting the photons emitted by the radioactive markers.

32. (Previously presented) The apparatus as claimed in claim 29,
wherein the at least one CCD camera comprises two cooled CCD cameras and wherein the at least one SPECT detector comprises two SPECT detectors facing one another, the two cooled CCD cameras being oriented parallel and oppositely to one another between the two SPECT detectors facing one another and wherein the apparatus further comprises:
two masks with at least two apertures in each case, and
a respective layer being situated in front of the SPECT detectors, said layer largely reflecting the photons emitted by the bioluminescent and/or fluorescent markers and largely transmitting the photons emitted by the radioactive markers.

33. (Previously presented) The apparatus as claimed in claim 32, wherein the respective layer situated in front of the SPECT detector is a diffused layer which is suited to diffusely reflect the photons emitted by the bioluminescent and/or fluorescent markers.

34. (Previously presented) The apparatus as claimed in claim 29,
wherein the at least one CCD camera comprises two cooled CCD cameras, and wherein the at least one SPECT detector comprises at least two SPECT detectors, the two cooled CCD cameras being oriented in the same direction and spaced apart from one another,
the two SPECT detectors being arranged perpendicular to the CCD cameras, and
wherein the apparatus further comprises:
two masks with at least two apertures in each case and two lenses between the two SPECT detectors, and
two reflectors essentially comprising a layer, which are oriented in such a way that they largely reflect, in the direction of the CCD cameras, the photons that are emitted by the bioluminescent and/or fluorescent markers, transmitted through the apertures in the masks in the direction of the SPECT detectors and focused by the lenses.

35. (Previously presented) The apparatus as claimed in claim 34, comprising a position sensor for determining the current position of a subject to be examined.

36. (Previously presented) The apparatus as claimed in claim 34, wherein the CCD cameras have fields of view and wherein the masks are suited to be moved out of the fields of view of the CCD cameras (position B) and can be moved into the fields of view (position A) during a measurement.

37. (Previously presented) The apparatus as claimed in claim 31, wherein the aperture is a countersunk elongate opening.

38. (Previously presented) The apparatus as claimed in claim 29,
wherein the at least one first detector comprises a cooled CCD camera,
and the at least one second detector comprises a SPECT detector being arranged perpendicular to the CCD camera, wherein the apparatus further comprises:
a shielding arranged in front of the SPECT detector and bent away at an angle of 90°, and
a reflective layer fixed on the shielding and likewise bent at an angle of 90°, the bending edge of said layer lying on the bending edge of the shielding,
wherein the reflective layer covers an aperture in the shielding, the SPECT detector, the shielding together with the reflective layer and the aperture and also mirrors and laser coupling-in arrangements are accommodated on a platform formed in displaceable fashion.

39. (Previously presented) The apparatus as claimed in claim 38, wherein the displaceable platform is arranged on a mounting support formed in rotatable fashion.

40. (Previously presented) The apparatus as claimed in claim 38, wherein separate fields of view of the reflective layer are imaged in a manner adjoining one another by an arrangement of mirrors in the objective of the CCD camera.

41. (Previously presented) The apparatus as claimed in claim 38, wherein laser beam coupling-in arrangements and also mirrors that are transmissive on one side are accommodated

opposite one another on the displaceable platform in order to excite near infrared fluorescent markers in the object by means of laser beams.

42. (Canceled)

43. (Currently amended) An imaging method, comprising:
alternately determining in vivo distributions of bioluminescent and/or fluorescent markers and in vivo distributions of radioactive markers with a common measurement apparatus at identical projection angles, wherein the distribution of the bioluminescent and/or fluorescent markers is determined by separate detection of photons having a first average energy, which are emitted by the bioluminescent and/or fluorescent markers, by at least one first detector and, alternately with respect thereto, the distribution of the radioactive markers is determined by separate detection of photons having a second average energy, which are emitted by the radioactive markers, by at least one second detector, wherein the at least one first detector and the at least one second detector are fixedly arranged in a specific spatial arrangement relative to each other; and wherein the at least one first detector and the at least one second detector are fixedly arranged as a rigid arrangement, and
wherein the photons of the bioluminescent and/or fluorescent markers having the first average energy and the photons of the radioactive markers having the second average energy are separated for the separate detection with the aid of a layer, the layer essentially reflecting [[or]] the photons of the bioluminescent and/or fluorescent markers and transmitting the photons of the radioactive markers ~~in a manner dependent on their energy~~; and
reconstructing an image of the distribution of the markers following the determining.